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DENSITY SENSITIVE LINES FROM SELECTED MEMBERS OF THE SODIUM-LIK--ETC(U)
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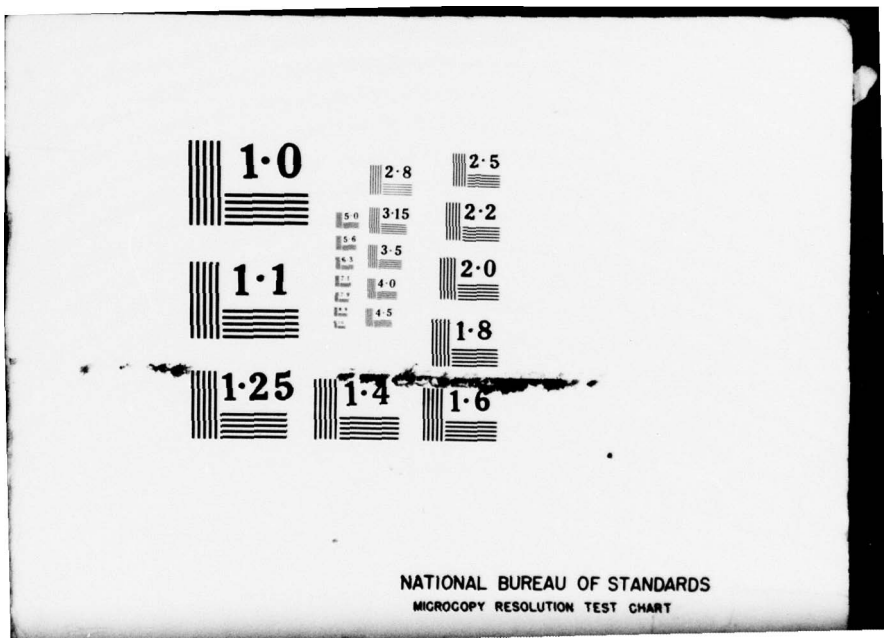
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NRL Memorandum Report 3682

Density Sensitive Lines from Selected Members of the Sodium-Like Isoelectronic Sequence

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Relative intensities of spectral lines in the sodium isoelectronic sequence are presented. Results are presented for ions of calcium, iron, zinc, krypton and molybdenum for transitions between the n = 3 and n = 4 levels.

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DENSITY SENSITIVE LINES FROM SELECTED MEMBERS OF THE SODIUM-LIKE ISOELECTRONIC SEQUENCE

I. Introduction

The spectral emission features observed from high temperature plasmas can provide a wealth of information on conditions within the plasma. For plasmas of moderate densities the low lying excited state populations of highly charged ions are governed by electron collision and radiative decay rates. Once the level populations are known it is possible to establish the plasma temperature and density by spectroscopic techniques. One such method is to determine the intensity ratio of selected spectral lines.

In this report calculations have been done for spectral line ratios that exhibit a strong density dependence. Results are presented for the sodium-like ions of calcium, iron, zinc, krypton and molybdenum for transitions between the $n = 3$ and $n = 4$ levels.

II. Results and Discussion

Relative intensities of spectral lines in the sodium isoelectronic sequence presented in this report are derived from the electron-impact collision cross sections and transition probabilities given in a previous paper.[1] In the calculation of relative intensities we have ignored the splitting of all levels in all ions and therefore our results do not represent relative intensities of individual lines but rather the relative intensities of multiplets.

Collision strengths $\Omega(3s,3p)$ and $\Omega(3p,3d)$ for Zn XX, Kr XXVI and Mo XXXII were obtained from Table 4 of ref. 1 using the relations

Note: Manuscript submitted December 14, 1977.

$$\Omega(3s,3p) = \Omega(3s_{1/2}, 3p_{1/2}) + \Omega(3s_{1/2}, 3p_{3/2}),$$

$$\Omega(3p,3d) = \Omega(3p_{1/2}, 3d) + \Omega(3p_{3/2}, 3d) .$$

The corresponding transition probabilities were recalculated from values in Table 3 of ref. 1 for the center of gravity of the 3p term. The effective wavelengths of the multiplets adopted in our calculation are given in Table 1.

Recently Burkhalter et al.[2] identified a number of spectral lines of Mo XXXII. Our extrapolated term values (see ref. 1) agree with observed values within 1% except for the 3d term where the difference is 2.5%. The effect of this change in energy levels on line intensities is practically negligible with the exception of the 4f - 4d transition. The observed energy difference for this multiplet is 21% smaller than our extrapolated value.

A subset of the equations of statistical equilibrium for the population of atomic levels with principal quantum number less than n = 5 were solved with the assumption of an optically thin plasma. The excited level populations were determined by a balance between electron collisional excitation and electron collisional de-excitation and spontaneous radiative decay. All density effects on atomic levels and on collisional cross sections were ignored. In particular, multiple collisions were neglected as were contributions from ionization and recombination processes.

In an optically thin plasma, the intensity of a spectral line corresponding to the transition between levels i and k is given by

$$I_{i \to k} = (4\pi)^{-1} N_i \ell A_{ik} E_{ik},$$

where N_i is the density of atoms excited to the level i, ℓ the length of the emitting column, A_{ik} the coefficient of transition probability and E_{ik} the energy of the emitted photon.

Relative intensities of multiplets $n\ell - n'\ell'$ with respect to the 3p - 3s transition are shown in Tables 2 - 26 for ten values of the temperature T (kT given in eV) and ten electron densities (LOG N means log N_e and N_e is given in cm^{-3}). The intensity ratios are shown in a semi-logarithmic form (e.g. 7.23-03 means 7.23×10^{-3} etc.).

The dependence of some typical intensity ratios on electron density at one representative temperature for each ion is displayed on Figures 1 - 5.

Using a similar method, Feldman et al.[3] and Feldman and Doschek[4] obtained the ratio $R = I(3d_{5/2} - 3p_{3/2}) / I(3p_{3/2} - {}^3s_{1/2})$ for Fe XVI as a function of electron density. Their results may be compared with our values assuming that the population of individual J - sublevels of the $n\ell$ level is proportional to the statistical weight 2J + 1. We find that our curve representing the ratio R is shifted to lower values of N_e as compared to curves in ref. 3 and 4, so that electron densities derived from a given ratio R are slightly smaller if our results are used. The disagreement is most pronounced around $N_e = 10^{18}$, where our curve gives the electron density about two times smaller. The difference is probably caused by higher excitation cross sections used in our calculation.

At electron densities about 10^{20} cm^{-3}, the screening effect of free electrons on atomic levels can not be neglected and our results for

relative intensities should be regarded as a limiting case. Also, at such high densities the optical depth of resonance lines may not be negligible even if the emitting region is very small. In this density regime the results presented in Tables 2 - 26 should be applied with caution.

Acknowledgement

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References

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3. U. Feldman, G. A. Doschek, D. K. Prinz, and D. J. Nagel, "Space Resolved Spectra of Laser-Produced Plasmas in the XUV. J. Appl. Phys. 47, 1341, April 1976.

4. U. Feldman and G. A. Doschek, "Plasma Diagnostic Using High-Resolution Spectroscopic Techniques," J. Opt. Soc. Am. 67, 726, June 1977.

TABLE 1

Adopted effective wavelengths (Å) of multiplets.

Transition	Ca X	Fe XVI	Zn XX	Kr XXVI	Mo XXXII
3p - 3s	563.06	343.48	267.70	191.46	141.82
3d - 3p	417.08	259.00	205.94	156.67	123.76
4s - 3p	152.62	63.44	41.57	25.19	16.87
4p - 3s	111.04	50.42	34.12	21.26	14.47
4p - 3d	206.95	76.56	48.28	28.23	18.52
4d - 3p	123.49	54.53	36.55	22.62	15.35
4f - 3d	167.00	66.33	42.66	25.49	16.93
4p - 4s	1476.3	862.94	661.74	475.09	354.67
4d - 4p	1151.9	707.06	558.11	416.77	325.33
4f - 4d	3474.7	1664.3	1071.5	711.04	505.23

TABLE 2

CALCIUM X

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
10	13	7.23-03	4.10-05	2.32-06	6.92-07	1.50-06	2.60-06	4.48-09	6.24-09	4.35-11
11	14	7.32-03	4.11-05	2.38-06	7.09-07	1.51-06	2.48-06	4.59-09	6.27-09	4.14-11
12	15	8.24-03	4.15-05	2.93-06	8.73-07	1.58-06	2.73-06	5.66-09	6.57-09	4.56-11
14	16	1.72-02	4.54-05	8.38-06	2.50-06	2.52-06	4.38-06	1.62-08	1.05-08	7.32-11
16	17	8.47-02	9.14-05	5.94-05	1.77-05	2.55-05	4.07-05	1.15-07	1.06-07	6.80-10
18	18	2.49-01	6.42-04	5.26-04	1.57-04	4.22-04	8.40-04	1.02-06	1.75-06	1.40-08
19	19	3.14-01	3.62-03	2.94-03	8.77-04	2.62-03	5.69-03	5.68-06	1.09-05	9.50-08
20	20	3.23-01	6.60-03	5.34-03	1.59-03	4.82-03	1.06-02	1.03-05	2.00-05	1.77-07
21	21	3.23-01	7.18-03	5.82-03	1.74-03	5.25-03	1.15-02	1.12-05	2.18-05	1.93-07
22	22	3.23-01	7.25-03	5.87-03	1.75-03	5.30-03	1.16-02	1.13-05	2.20-05	1.94-07
20	13	3.07-02	2.18-03	1.99-04	5.92-05	2.11-04	4.47-04	3.83-07	8.79-07	7.48-09
20	14	3.10-02	2.18-03	2.02-04	6.02-05	2.12-04	4.49-04	3.90-07	8.82-07	7.51-09
20	15	3.39-02	2.19-03	2.35-04	7.00-05	2.20-04	4.66-04	4.53-07	9.13-07	7.79-09
20	16	6.22-02	2.33-03	5.57-04	1.66-04	3.10-04	6.61-04	1.07-06	1.29-06	1.10-08
20	17	2.92-01	4.00-03	3.49-03	1.04-03	2.31-03	4.50-03	6.74-06	9.61-06	7.53-08
20	18	9.93-01	2.52-02	3.07-02	9.16-03	4.09-02	9.70-02	5.93-05	1.70-04	1.62-06
20	19	1.35+00	1.64-01	2.02-01	6.01-02	3.05-01	7.90-01	3.89-04	1.27-03	1.32-05
20	20	1.40+00	3.51-01	4.30-01	1.28-01	6.59-01	1.72+00	8.30-04	2.74-03	2.88-05
20	21	1.40+00	3.95-01	4.84-01	1.44-01	7.43-01	1.95+00	9.35-04	3.09-03	3.25-05
20	22	1.40+00	4.00-01	4.91-01	1.46-01	7.53-01	1.97+00	9.47-04	3.13-03	3.30-05

TABLE 3

CALCIUM X

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4F-3S	4F-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
50	13	7.26-02	2.21-02	3.00-03	8.96-04	4.07-03	8.97-03	5.80-06	1.69-05	1.50-07
50	14	7.31-02	2.21-02	3.03-03	9.05-04	4.09-03	8.99-03	5.86-06	1.69-05	1.50-07
50	15	7.79-02	2.22-02	3.33-03	9.93-04	4.18-03	9.24-03	6.43-06	1.74-05	1.54-07
50	16	1.25-01	2.31-02	6.26-03	1.87-03	5.35-03	1.20-02	1.21-05	2.22-05	2.00-07
50	17	5.30-01	3.43-02	3.29-02	9.80-03	2.73-02	5.96-02	6.35-05	1.13-04	9.97-07
50	18	2.10+00	1.83-01	2.81-01	8.37-02	4.93-01	1.29+00	5.42-04	2.05-03	2.16-05
50	19	3.17+00	1.38+00	2.17+00	6.49-01	4.51+00	1.30+01	4.20-03	1.88-02	2.17-04
50	20	3.36+00	3.65+00	5.74+00	1.71+00	1.21+01	3.52+01	1.11-02	5.03-02	5.88-04
50	21	3.38+00	4.35+00	6.84+00	2.04+00	1.44+01	4.20+01	1.32-02	6.00-02	7.03-04
50	22	3.39+00	4.43+00	6.98+00	2.08+00	1.47+01	4.29+01	1.35-02	6.12-02	7.17-04
75	13	8.77-02	3.57-02	5.67-03	1.69-03	7.84-03	1.70-02	1.09-05	3.26-05	2.83-07
75	14	8.82-02	3.57-02	5.71-03	1.70-03	7.85-03	1.70-02	1.10-05	3.27-05	2.84-07
75	15	9.33-02	3.59-02	6.15-03	1.83-03	8.03-03	1.74-02	1.19-05	3.34-05	2.91-07
75	16	1.43-01	3.72-02	1.05-02	3.13-03	9.98-03	2.19-02	2.03-05	4.15-05	3.66-07
75	17	5.76-01	5.32-02	5.03-02	1.50-02	4.39-02	9.78-02	9.72-05	1.82-04	1.63-06
75	18	2.40+00	2.64-01	4.23-01	1.26-01	7.80-01	2.10+00	8.17-04	3.24-03	3.51-05
75	19	3.80+00	2.09+00	3.47+00	1.04+00	7.72+00	2.28+01	6.71-03	3.21-02	3.81-04
75	20	4.07+00	6.03+00	1.00+01	2.99+00	2.27+01	6.76+01	1.94-02	9.43-02	1.13-03
75	21	4.11+00	7.40+00	1.23+01	3.67+00	2.79+01	8.30+01	2.37-02	1.16-01	1.39-03
75	22	4.12+00	7.57+00	1.26+01	3.75+00	2.85+01	8.50+01	2.43-02	1.18-01	1.42-03

TABLE 4

CALCIUM X

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
100	13	9.61-02	4.49-02	7.89-03	2.35-03	1.09-02	2.30-02	1.52-05	4.52-05	3.85-07
100	14	9.66-02	4.49-02	7.94-03	2.37-03	1.09-02	2.31-02	1.53-05	4.53-05	3.86-07
100	15	1.02-01	4.50-02	8.45-03	2.52-03	1.11-02	2.36-02	1.63-05	4.63-05	3.94-07
100	16	1.51-01	4.67-02	1.35-02	4.03-03	1.36-02	2.92-02	2.61-05	5.65-05	4.88-07
100	17	5.88-01	6.51-02	6.05-02	1.80-02	5.42-02	1.21-01	1.17-04	2.25-04	2.03-06
100	18	2.53+00	3.08-01	5.03-01	1.50-01	9.45-01	2.58+00	9.72-04	3.93-03	4.31-05
100	19	4.14+00	2.51+00	4.28+00	1.28+00	9.86+00	2.94+01	8.27-03	4.10-02	4.92-04
100	20	4.48+00	7.70+00	1.31+01	3.92+00	3.08+01	9.29+01	2.54-02	1.28-01	1.55-03
100	21	4.53+00	9.64+00	1.65+01	4.91+00	3.87+01	1.17+02	3.18-02	1.61-01	1.95-03
100	22	4.54+00	9.88+00	1.69+01	5.04+00	3.97+01	1.20+02	3.26-02	1.65-01	2.00-03
125	13	1.01-01	5.11-02	9.66-03	2.88-03	1.32-02	2.75-02	1.86-05	5.50-05	4.59-07
125	14	1.02-01	5.11-02	9.71-03	2.90-03	1.33-02	2.75-02	1.88-05	5.51-05	4.60-07
125	15	1.07-01	5.13-02	1.03-02	3.06-03	1.35-02	2.81-02	1.98-05	5.62-05	4.70-07
125	16	1.55-01	5.30-02	1.57-02	4.68-03	1.63-02	3.44-02	3.03-05	6.79-05	5.75-07
125	17	5.88-01	7.29-02	6.64-02	1.98-02	6.06-02	1.36-01	1.28-04	2.52-04	2.27-06
125	18	2.59+00	3.32-01	5.48-01	1.63-01	1.04+00	2.86+00	1.06-03	4.31-03	4.78-05
125	19	4.36+00	2.76+00	4.79+00	1.43+00	1.12+01	3.38+01	9.24-03	4.67-02	5.65-04
125	20	4.74+00	8.86+00	1.54+01	4.59+00	3.69+01	1.12+02	2.97-02	1.53-01	1.87-03
125	21	4.81+00	1.13+01	1.96+01	5.85+00	4.70+01	1.43+02	3.79-02	1.95-01	2.39-03
125	22	4.82+00	1.16+01	2.02+01	6.01+00	4.83+01	1.47+02	3.89-02	2.01-01	2.45-03

TABLE 5

CALCIUM X

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
150	13	1.05-01	5.55-02	1.11-02	3.30-03	1.51-02	3.08-02	2.14-05	6.27-05	5.15-07
150	14	1.05-01	5.55-02	1.11-02	3.32-03	1.51-02	3.09-02	2.15-05	6.28-05	5.16-07
150	15	1.10-01	5.57-02	1.17-02	3.49-03	1.54-02	3.15-02	2.26-05	6.40-05	5.27-07
150	16	1.57-01	5.75-02	1.73-02	5.16-03	1.84-02	3.82-02	3.34-05	7.66-05	6.38-07
150	17	5.83-01	7.81-02	6.99-02	2.09-02	6.47-02	1.44-01	1.35-04	2.69-04	2.42-06
150	18	2.62+00	3.45-01	5.72-01	1.71-01	1.08+00	3.02+00	1.10-03	4.51-03	5.04-05
150	19	4.50+00	2.91+00	5.10+00	1.52+00	1.21+01	3.68+01	9.86-03	5.05-02	6.14-04
150	20	4.93+00	9.70+00	1.70+01	5.08+00	4.14+01	1.26+02	3.29-02	1.72-01	2.11-03
150	21	5.00+00	1.25+01	2.20+01	6.57+00	5.36+01	1.63+02	4.25-02	2.23-01	2.73-03
150	22	5.01+00	1.29+01	2.27+01	6.76+00	5.52+01	1.68+02	4.38-02	2.29-01	2.81-03
200	13	1.09-01	6.12-02	1.32-02	3.93-03	1.77-02	3.54-02	2.55-05	7.38-05	5.91-07
200	14	1.09-01	6.12-02	1.32-02	3.95-03	1.78-02	3.54-02	2.56-05	7.39-05	5.92-07
200	15	1.14-01	6.14-02	1.38-02	4.12-03	1.81-02	3.61-02	2.67-05	7.52-05	6.03-07
200	16	1.59-01	6.33-02	1.95-02	5.81-03	2.13-02	4.31-02	3.76-05	8.67-05	7.21-07
200	17	5.67-01	8.43-02	7.31-02	2.18-02	6.88-02	1.53-01	1.41-04	2.86-04	2.55-06
200	18	2.62+00	3.54-01	5.90-01	1.76-01	1.11+00	3.14+00	1.14-03	4.63-03	5.25-05
200	19	4.66+00	3.05+00	5.43+00	1.62+00	1.31+01	4.00+01	1.05-02	5.45-02	6.69-04
200	20	5.16+00	1.08+01	1.92+01	5.73+00	4.75+01	1.46+02	3.71-02	1.97-01	2.43-03
200	21	5.25+00	1.43+01	2.54+01	7.58+00	6.29+01	1.93+02	4.91-02	2.62-01	3.23-03
200	22	5.26+00	1.47+01	2.63+01	7.83+00	6.51+01	2.00+02	5.07-02	2.70-01	3.34-03

TABLE 6

CALCIUM X

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
250	13	1.11-01	6.46-02	1.47-02	4.37-03	1.96-02	3.83-02	2.83-05	8.13-05	6.40-07
250	14	1.12-01	6.47-02	1.47-02	4.39-03	1.96-02	3.83-02	2.84-05	8.15-05	6.41-07
250	15	1.16-01	6.48-02	1.53-02	4.56-03	1.99-02	3.90-02	2.95-05	8.28-05	6.52-07
250	16	1.59-01	6.68-02	2.08-02	6.21-03	2.32-02	4.61-02	4.02-05	9.67-05	7.71-07
250	17	5.50-01	8.76-02	7.37-02	2.20-02	7.03-02	1.55-01	1.42-04	2.92-04	2.59-06
250	18	2.59+00	3.53-01	5.88-01	1.75-01	1.10+00	3.14+00	1.13-03	4.58-03	5.24-05
250	19	4.75+00	3.08+00	5.53+00	1.65+00	1.35+01	4.14+01	1.07-02	5.61-02	6.92-04
250	20	5.30+00	1.14+01	2.05+01	6.12+00	5.12+01	1.58+02	3.96-02	2.13-01	2.64-03
250	21	5.40+00	1.54+01	2.77+01	8.26+00	6.93+01	2.13+02	5.35-02	2.88-01	3.57-03
250	22	5.41+00	1.60+01	2.87+01	8.56+00	7.18+01	2.21+02	5.54-02	2.99-01	3.70-03
300	13	1.13-01	6.69-02	1.57-02	4.69-03	2.09-02	4.03-02	3.04-05	8.67-05	6.73-07
300	14	1.13-01	6.69-02	1.58-02	4.71-03	2.09-02	4.04-02	3.05-05	8.69-05	6.74-07
300	15	1.17-01	6.71-02	1.63-02	4.87-03	2.12-02	4.10-02	3.15-05	8.82-05	6.86-07
300	16	1.58-01	6.90-02	2.17-02	6.47-03	2.46-02	4.80-02	4.19-05	1.02-04	8.03-07
300	17	5.34-01	8.94-02	7.34-02	2.19-02	7.05-02	1.54-01	1.42-04	2.93-04	2.58-06
300	18	2.55+00	3.47-01	5.78-01	1.72-01	1.07+00	3.08+00	1.12-03	4.46-03	5.14-05
300	19	4.80+00	3.06+00	5.53+00	1.65+00	1.36+01	4.18+01	1.07-02	5.64-02	6.99-04
300	20	5.39+00	1.18+01	2.13+01	6.36+00	5.36+01	1.66+02	4.12-02	2.23-01	2.77-03
300	21	5.51+00	1.62+01	2.93+01	8.74+00	7.38+01	2.28+02	5.66-02	3.07-01	3.81-03
300	22	5.52+00	1.68+01	3.04+01	9.08+00	7.67+01	2.37+02	5.88-02	3.19-01	3.96-03

TABLE 7

IRON XVI

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4F-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
50	14	4.57-02	3.31-03	4.36-04	1.06-04	8.25-04	1.24-03	2.04-07	5.33-07	9.36-09
50	15	4.64-02	3.32-03	4.45-04	1.08-04	8.29-04	1.25-03	2.08-07	5.35-07	9.42-09
50	16	5.35-02	3.35-03	5.32-04	1.29-04	8.70-04	1.32-03	2.49-07	5.62-07	9.94-09
50	17	1.21-01	3.69-03	1.40-03	3.40-04	1.33-03	2.14-03	6.54-07	8.62-07	1.62-08
50	18	6.64-01	7.40-03	9.84-03	2.39-03	9.88-03	1.93-02	4.60-06	6.38-06	1.46-07
50	19	1.58+00	4.78-02	8.91-02	2.17-02	1.63-01	3.61-01	4.17-05	1.05-04	2.73-06
50	20	1.90+00	3.54-01	6.87-01	1.67-01	1.47+00	3.43+00	3.21-04	9.50-04	2.59-05
50	21	1.94+00	1.16+00	2.27+00	5.52-01	4.96+00	1.17+01	1.06-03	3.21-03	8.85-05
50	22	1.95+00	1.52+00	2.96+00	7.19-01	6.49+00	1.53+01	1.38-03	4.19-03	1.16-04
50	23	1.95+00	1.56+00	3.05+00	7.42-01	6.69+00	1.58+01	1.43-03	4.32-03	1.19-04
75	14	6.17-02	1.16-02	1.81-03	4.41-04	3.65-03	5.62-03	8.48-07	2.35-06	4.24-08
75	15	6.25-02	1.16-02	1.84-03	4.48-04	3.66-03	5.65-03	8.61-07	2.36-06	4.26-08
75	16	7.06-02	1.17-02	2.13-03	5.17-04	3.82-03	5.92-03	9.94-07	2.47-06	4.47-08
75	17	1.49-01	1.27-02	4.96-03	1.20-03	5.54-03	9.06-03	2.32-06	3.58-06	6.84-08
75	18	7.35-01	2.36-02	3.25-02	7.90-03	3.54-02	7.17-02	1.52-05	2.29-05	5.41-07
75	19	2.08+00	1.44-01	2.92-01	7.10-02	5.92-01	1.38+00	1.37-04	3.82-04	1.04-05
75	20	2.59+00	1.10+00	2.35+00	5.70-01	5.63+00	1.38+01	1.10-03	3.64-03	1.04-04
75	21	2.66+00	4.06+00	8.57+00	2.08+00	2.10+01	5.21+01	4.01-03	1.36-02	3.94-04
75	22	2.67+00	5.45+00	1.17+01	2.84+00	2.88+01	7.14+01	5.47-03	1.86-02	5.39-04
75	23	2.67+00	5.66+00	1.21+01	2.95+00	2.99+01	7.42+01	5.68-03	1.93-02	5.60-04

TABLE 8

IRON XVI

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
100	14	7.17-02	2.13-02	3.77-03	9.17-04	7.66-03	1.18-02	1.76-06	4.94-06	8.92-08
100	15	7.26-02	2.14-02	3.82-03	9.29-04	7.69-03	1.19-02	1.79-06	4.96-06	8.96-08
100	16	8.11-02	2.15-02	4.32-03	1.05-03	7.98-03	1.24-02	2.02-06	5.15-06	9.35-08
100	17	1.63-01	2.32-02	9.24-03	2.24-03	1.12-02	1.83-02	4.32-06	7.25-06	1.38-07
100	18	7.93-01	4.12-02	5.72-02	1.39-02	6.49-02	1.33-01	2.67-05	4.19-05	1.00-06
100	19	2.37+00	2.41-01	5.11-01	1.24-01	1.08+00	2.60+00	2.39-04	6.98-04	1.96-05
100	20	3.02+00	1.89+00	4.21+00	1.02+00	1.07+01	2.69+01	1.97-03	6.91-03	2.03-04
100	21	3.11+00	7.31+00	1.64+01	3.99+00	4.27+01	1.08+02	7.68-03	2.76-02	8.19-04
100	22	3.12+00	1.03+01	2.32+01	5.64+00	6.05+01	1.54+02	1.08-02	3.91-02	1.16-03
100	23	3.13+00	1.08+01	2.42+01	5.88+00	6.31+01	1.61+02	1.13-02	4.07-02	1.21-03
150	14	8.35-02	3.87-02	8.09-03	1.97-03	1.60-02	2.44-02	3.78-06	1.04-05	1.84-07
150	15	8.44-02	3.87-02	8.17-03	1.99-03	1.61-02	2.45-02	3.82-06	1.04-05	1.85-07
150	16	9.29-02	3.90-02	8.99-03	2.18-03	1.67-02	2.55-02	4.20-06	1.08-05	1.92-07
150	17	1.76-01	4.16-02	1.71-02	4.15-03	2.26-02	3.60-02	7.98-06	1.46-05	2.72-07
150	18	8.32-01	7.02-02	9.63-02	2.34-02	1.14+01	2.33-01	4.50-05	7.38-05	1.76-06
150	19	2.66+00	3.89-01	8.54-01	2.07-01	1.87+00	4.65+00	3.99-04	1.21-03	3.51-05
150	20	3.51+00	3.11+00	7.26+00	1.76+00	1.95+01	5.04+01	3.40-03	1.26-02	3.81-04
150	21	3.64+00	1.31+01	3.09+01	7.51+00	8.51+01	2.22+02	1.44-02	5.49-02	1.67-03
150	22	3.66+00	1.95+01	4.59+01	1.11+01	1.27+02	3.30+02	2.15-02	8.18-02	2.49-03
150	23	3.66+00	2.05+01	4.83+01	1.17+01	1.33+02	3.47+02	2.26-02	8.60-02	2.62-03

TABLE 9

IRON XVI

INTENSITY RATIO I(3P - 1'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
200	14	9.00-02	5.15-02	1.21-02	2.93-03	2.32-02	3.47-02	5.64-06	1.50-05	2.62-07
200	15	9.09-02	5.15-02	1.22-02	2.96-03	2.33-02	3.48-02	5.69-06	1.51-05	2.63-07
200	16	9.92-02	5.19-02	1.32-02	3.20-03	2.40-02	3.60-02	6.16-06	1.55-05	2.72-07
200	17	1.80-01	5.51-02	2.31-02	5.62-03	3.19-02	4.97-02	1.08-05	2.06-05	3.75-07
200	18	8.34-01	9.00-02	1.21-01	2.95-02	1.48-01	2.98-01	5.67-05	9.54-05	2.25-06
200	19	2.80+00	4.79-01	1.07+00	2.60-01	2.37+00	6.01+00	4.99-04	1.53-03	8.53-05
200	20	3.77+00	3.88+00	9.28+00	2.25+00	2.56+01	6.72+01	4.34-03	1.65-02	5.07-04
200	21	3.93+00	1.73+01	4.18+01	1.02+01	1.18+02	3.12+02	1.95-02	7.65-02	2.36-03
200	22	3.96+00	2.67+01	6.44+01	1.56+01	1.83+02	4.83+02	3.01-02	1.18-01	3.65-03
200	23	3.96+00	2.82+01	6.81+01	1.65+01	1.94+02	5.11+02	3.18-02	1.25-01	3.86-03
250	14	9.41-02	6.07-02	1.55-02	3.76-03	2.90-02	4.26-02	7.24-06	1.87-05	3.21-07
250	15	9.49-02	6.08-02	1.56-02	3.79-03	2.91-02	4.27-02	7.29-06	1.88-05	3.22-07
250	16	1.03-01	6.11-02	1.67-02	4.06-03	3.00-02	4.41-02	7.81-06	1.93-05	3.33-07
250	17	1.81-01	6.48-02	2.77-02	6.74-03	3.91-02	5.97-02	1.30-05	2.53-05	4.50-07
250	18	8.24-01	1.03-01	1.37-01	3.32-02	1.70-01	3.39-01	6.39-05	1.10-04	2.56-06
250	19	2.86+00	5.34-01	1.20+00	2.91-01	2.67+00	6.87+00	5.60-04	1.73-03	5.19-05
250	20	3.93+00	4.36+00	1.06+01	2.57+00	2.96+01	7.86+01	4.94-03	1.91-02	5.93-04
250	21	4.11+00	2.03+01	4.97+01	1.21+01	1.43+02	3.81+02	2.32-02	9.25-02	2.87-03
250	22	4.15+00	3.22+01	7.88+01	1.91+01	2.28+02	6.06+02	3.68-02	1.47-01	4.57-03
250	23	4.15+00	3.42+01	8.37+01	2.03+01	2.42+02	6.44+02	3.91-02	1.56-01	4.86-03

AD NUMBER	**********	E000116 ********** SCN-- A
FIELD 2:	FLD/GRP(S)	20090
FIELD 3:	ENTRY CLASS	U
FIELD 4:	NTIS PRICES	HC MF
FIELD 5:	SOURCE NAME	NAVAL RESEARCH LAB WASHINGTON D C
FIELD 6:	UNCLASS. TITLE	DENSITY SENSITIVE LINES FROM SELECTED MEMBE ISOELECTRONIC SEQUENCE.
FIELD 7:	CLASS. TITLE	
FIELD 8:	TITLE CLASS.	U
FIELD 9:	DESCRIPTIVE NOTE	INTERIM REPT.,
FIELD 10:	PERSONAL AUTHORS	DAVIS,JACK ;BLAHA,M. ;
FIELD 11:	REPORT DATE	DEC 77
FIELD 12:	PAGINATION	36P
FIELD 13:	SOURCE ACRONYM	
FIELD 14:	REPORT NUMBER	NRL-MR-3682
FIELD 15:	CONTRACT NUMBER	E(49-20)-1006
FIELD 16:	PROJECT NUMBER	
FIELD 17:	TASK NUMBER	
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FIELD 24:	DESCRIPTOR CLASS.	U
FIELD 25:	IDENTIFIERS	SODIUM ISOELECTRONIC SEQUENCE, LPN-NRL-H02-
FIELD 26:	IDENTIFIER CLASS.	U
FIELD 27:	ABSTRACT	RELATIVE INTENSITIES OF SPECTRAL LINES IN I PRESENTED. RESULTS ARE PRESENTED FOR IONS O MOLYBDENUM FOR TRANSITIONS BETWEEN THE N =
FIELD 28:	ABSTRACT CLASS.	U
FIELD 29:	INITIAL INVENTORY	0
FIELD 30:	ANNOTATION	
FIELD 31:	SPECIAL INDICATOR	@
FIELD 32:	REGRADING CATEGORY	
FIELD 33:	LIMITATION CODES	1 21
FIELD 34:	SOURCE SERIAL	
FIELD 35:	SOURCE CODE	251950
FIELD 36:	DOCUMENT LOCATION	7
FIELD 37:	CLASSIFIED BY	
FIELD 38:	DECLASSIFIED ON	
FIELD 39:	DOWNGRADED TO CONF.	
FIELD 40:	GEOPOLITICAL CODE	1100
FIELD 41:	SOURCE TYPE CODE	N
FIELD 42:	TAB ISSUE NUMBER	@@--@@

E000116 **********SCN-- AJ018N

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VAL RESEARCH LAB WASHINGTON D C
NSITY SENSITIVE LINES FROM SELECTED MEMBERS OF THE SODIUM-LIKE
OELECTRONIC SEQUENCE.

TERIM REPT.,
VIS,JACK ;BLAHA,M. ;
DEC 77
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L-MR-3682
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DIUM ISOELECTRONIC SEQUENCE, LPN-NRL-H02-37

ATIVE INTENSITIES OF SPECTRAL LINES IN THE SODIUM ISOELECTRONIC SEQUENCE ARE
SENTED. RESULTS ARE PRESENTED FOR IONS OF CALCIUM, IRON, ZINC, KRYPTON, AND
YBDENUM FOR TRANSITIONS BETWEEN THE N = 3 AND N = 4 LEVELS.

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TABLE 10

IRON XVI

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
300	14	9.67-02	6.76-02	1.84-02	4.46-03	3.36-02	4.86-02	8.58-06	2.17-05	3.67-07
300	15	9.75-02	6.76-02	1.85-02	4.49-03	3.37-02	4.88-02	8.63-06	2.18-05	3.68-07
300	16	1.05-01	6.80-02	1.96-02	4.77-03	3.47-02	5.03-02	9.18-06	2.24-05	3.80-07
300	17	1.81-01	7.19-02	3.13-02	7.59-03	4.48-02	6.71-02	1.46-05	2.89-05	5.06-07
300	18	8.10-01	1.13-01	1.46-01	3.56-02	1.85-01	3.64-01	6.85-05	1.19-04	2.75-06
300	19	2.89+00	5.68-01	1.28+00	3.10-01	2.85+00	7.42+00	5.97-04	1.84-03	5.60-05
300	20	4.04+00	4.67+00	1.14+01	2.77+00	3.22+01	8.63+01	5.33-03	2.08-02	6.51-04
300	21	4.24+00	2.24+01	5.54+01	1.35+01	1.62+02	4.32+02	2.59-02	1.04-01	3.26-03
300	22	4.28+00	3.64+01	9.01+01	2.19+01	2.63+02	7.04+02	4.21-02	1.70-01	5.31-03
300	23	4.28+00	3.89+01	9.61+01	2.33+01	2.81+02	7.51+02	4.49-02	1.81-01	5.67-03
350	14	9.86-02	7.28-02	2.08-02	5.05-03	3.74-02	5.33-02	9.71-06	2.41-05	4.03-07
350	15	9.94-02	7.28-02	2.09-02	5.08-03	3.75-02	5.35-02	9.76-06	2.42-05	4.04-07
350	16	1.07-01	7.32-02	2.21-02	5.36-03	3.85-02	5.51-02	1.03-05	2.49-05	4.16-07
350	17	1.80-01	7.72-02	3.40-02	8.26-03	4.92-02	7.26-02	1.59-05	3.18-05	5.48-07
350	18	7.95-01	1.19-01	1.53-01	3.71-02	1.94-01	3.79-01	7.13-05	1.26-04	2.86-06
350	19	2.90+00	5.88-01	1.32+00	3.22-01	2.95+00	7.76+00	6.19-04	1.91-03	5.85-05
350	20	4.11+00	4.86+00	1.19+01	2.90+00	3.40+01	9.16+01	5.58-03	2.20-02	6.92-04
350	21	4.33+00	2.40+01	5.97+01	1.45+01	1.75+02	4.71+02	2.79-02	1.13-01	3.55-03
350	22	4.37+00	3.98+01	9.90+01	2.41+01	2.92+02	7.83+02	4.63-02	1.89-01	5.91-03
350	23	4.38+00	4.26+01	1.06+02	2.58+01	3.13+02	8.39+02	4.96-02	2.02-01	6.33-03

TABLE 11

IRON XVI

INTENSITY RATIO: I('L' - 'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4F-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
400	14	1.[illegible]-01	7.69-02	2.28-02	5.54-03	4.05-02	5.71-02	1.[illegible]-05	2.01-05	4.31-07
400	15	1.01-01	7.69-02	2.29-02	5.57-03	4.06-02	5.73-02	1.07-05	2.02-05	4.32-07
400	16	1.[illegible]-01	7.73-02	2.41-02	5.87-03	4.16-02	5.89-02	1.13-05	2.09-05	4.45-07
400	17	1.79-01	8.14-02	3.62-02	8.79-03	5.27-02	7.69-02	1.69-05	3.41-05	5.80-07
400	18	7.79-01	1.24-01	1.56-01	3.80-02	2.01-01	3.88-01	7.31-05	1.34-04	2.73-06
400	19	2.90+00	5.99-01	1.35+00	3.28-01	3.00+00	7.96+00	6.31-04	1.94-03	6.01-05
400	20	4.17+00	4.97+00	1.23+01	2.98+00	3.52+01	9.53+01	5.74-03	2.27-02	7.19-04
400	21	4.39+00	2.52+01	6.29+01	1.53+01	1.86+02	5.00+02	2.94-02	1.20-01	3.78-03
400	22	4.45+00	4.25+01	1.06+02	2.58+01	3.15+02	8.48+02	4.97-02	2.04-01	6.40-03
400	23	4.46+00	4.56+01	1.14+02	2.77+01	3.39+02	9.11+02	5.33-02	2.19-01	6.87-03
500	14	1.02-01	8.28-02	2.61-02	6.33-03	4.52-02	6.27-02	1.22-05	2.92-05	4.73-07
500	15	1.03-01	8.28-02	2.62-02	6.36-03	4.53-02	6.29-02	1.22-05	2.93-05	4.75-07
500	16	1.09-01	8.32-02	2.74-02	6.66-03	4.64-02	6.46-02	1.28-05	3.10-05	4.87-07
500	17	1.76-01	8.73-02	3.94-02	9.58-03	5.80-02	8.29-02	1.84-05	3.75-05	6.25-07
500	18	7.49-01	1.30-01	1.60-01	3.88-02	2.08-01	3.95-01	7.47-05	1.34-04	2.98-06
500	19	2.88+00	6.08-01	1.37+00	3.32-01	3.02+00	8.13+00	6.39-04	1.95-03	6.13-05
500	20	4.24+00	5.07+00	1.26+01	3.06+00	3.63+01	9.95+01	5.89-03	2.35-02	7.51-04
500	21	4.49+00	2.67+01	6.71+01	1.63+01	2.00+02	5.41+02	3.14-02	1.29-01	4.08-03
500	22	4.55+00	4.65+01	1.17+02	2.84+01	3.50+02	9.46+02	5.47-02	2.26-01	7.14-03
500	23	4.56+00	5.02+01	1.26+02	3.07+01	3.79+02	1.02+03	5.91-02	2.46-01	7.71-03

TABLE 12

ZINC XX

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4F-4S	4D-4P	4F-4D
50	14	3.41-02	5.18-04	7.00-05	1.51-05	1.31-04	1.59-04	1.65-08	3.65-08	1.19-09
50	15	3.43-02	5.18-04	7.06-05	1.52-05	1.31-04	1.60-04	1.67-08	3.65-08	1.20-09
50	16	3.69-02	5.21-04	7.63-05	1.64-05	1.34-04	1.64-04	1.80-08	3.74-08	1.23-09
50	17	6.19-02	5.46-04	1.34-04	2.88-05	1.65-04	2.08-04	3.16-08	4.60-08	1.56-09
50	18	2.68-01	8.08-04	7.12-04	1.53-04	6.04-04	9.57-04	1.68-07	1.68-07	7.18-09
50	19	9.31-01	3.61-03	6.50-03	1.40-03	9.11-03	1.79-02	1.53-06	2.54-06	1.34-07
50	20	1.29+00	2.77-02	5.71-02	1.23-02	1.07-01	2.20-01	1.35-05	2.99-05	1.65-06
50	21	1.34+00	1.57-01	3.33-01	7.17-02	6.68-01	1.42+00	7.88-05	1.87-04	1.06-05
50	22	1.34+00	3.16-01	6.76-01	1.45-01	1.37+00	2.92+00	1.60-04	3.82-04	2.19-05
50	23	1.34+00	3.53-01	7.54-01	1.62-01	1.53+00	3.26+00	1.78-04	4.26-04	2.44-05
100	14	5.96-02	9.32-03	1.71-03	3.67-04	3.65-03	4.83-03	4.03-07	1.02-06	3.62-08
100	15	6.00-02	9.33-03	1.72-03	3.69-04	3.65-03	4.84-03	4.06-07	1.02-06	3.63-08
100	16	6.34-02	9.36-03	1.81-03	3.89-04	3.71-03	4.93-03	4.28-07	1.04-06	3.70-08
100	17	9.68-02	9.70-03	2.75-03	5.91-04	4.37-03	5.94-03	6.49-07	1.22-06	4.46-08
100	18	3.86-01	1.32-02	1.21-02	2.61-03	1.29-02	2.15-02	2.87-06	3.59-06	1.61-07
100	19	1.52+00	5.06-02	1.06-01	2.28-02	1.76-01	3.88-01	2.50-05	4.92-05	2.91-06
100	20	2.29+00	3.85-01	9.51-01	2.05-01	2.20+00	5.13+00	2.25-04	6.15-04	3.85-05
100	21	2.42+00	2.43+00	6.23+00	1.34+00	1.55+01	3.70+01	1.47-03	4.34-03	2.77-04
100	22	2.43+00	5.76+00	1.48+01	3.18+00	3.73+01	8.91+01	3.50-03	1.04-02	6.68-04
100	23	2.44+00	6.68+00	1.72+01	3.69+00	4.33+01	1.04+02	4.06-03	1.21-02	7.77-04

TABLE 13

ZINC XX

INTENSITY RATIO I(N L = N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
150	14	7.19-02	2.39-02	5.15-03	1.11-03	1.10-02	1.47-02	1.22-06	3.07-06	1.10-07
150	15	7.23-02	2.39-02	5.17-03	1.11-03	1.10-02	1.47-02	1.22-06	3.08-06	1.11-07
150	16	7.58-02	2.40-02	5.39-03	1.16-03	1.12-02	1.50-02	1.27-06	3.12-06	1.12-07
150	17	1.10-01	2.47-02	7.59-03	1.63-03	1.29-02	1.76-02	1.79-06	3.60-06	1.32-07
150	18	4.16-01	3.24-02	2.96-02	6.36-03	3.42-02	5.68-02	6.98-06	9.56-06	4.26-07
150	19	1.73+00	1.15-01	2.49-01	5.36-02	4.34-01	9.89-01	5.89-05	1.21-04	7.42-06
150	20	2.76+00	8.66-01	2.26+00	4.87-01	5.61+00	1.36+01	5.35-04	1.56-03	1.02-04
150	21	2.94+00	5.76+00	1.57+01	3.37+00	4.20+01	1.04+02	3.70-03	1.17-02	7.80-04
150	22	2.97+00	1.49+01	4.08+01	8.77+00	1.10+02	2.74+02	9.63-03	3.08-02	2.06-03
150	23	2.97+00	1.78+01	4.86+01	1.04+01	1.32+02	3.27+02	1.15-02	3.68-02	2.46-03
200	14	7.91-02	3.78-02	9.16-03	1.97-03	1.91-02	2.58-02	2.16-06	5.34-06	1.90-07
200	15	7.95-02	3.78-02	9.19-03	1.98-03	1.91-02	2.54-02	2.17-06	5.34-06	1.91-07
200	16	8.30-02	3.79-02	9.51-03	2.05-03	1.94-02	2.58-02	2.25-06	5.42-06	1.94-07
200	17	1.17-01	3.90-02	1.27-02	2.74-03	2.21-02	2.99-02	3.01-06	6.17-06	2.25-07
200	18	4.23-01	5.00-02	4.50-02	9.69-03	5.50-02	8.96-02	1.06-05	1.53-05	6.72-07
200	19	1.82+00	1.68-01	3.70-01	7.95-02	6.55-01	1.52+00	8.74-05	1.83-04	1.14-05
200	20	3.02+00	1.26+00	3.38+00	7.28-01	8.64+00	2.15+01	7.99-04	2.41-03	1.61-04
200	21	3.24+00	8.64+00	2.42+01	5.21+00	6.73+01	1.70+02	5.72-03	1.88-02	1.27-03
200	22	3.27+00	2.38+01	6.71+01	1.44+01	1.89+02	4.77+02	1.59-02	5.26-02	3.58-03
200	23	3.28+00	2.89+01	8.17+01	1.76+01	2.30+02	5.82+02	1.93-02	6.41-02	4.36-03

TABLE 14

ZINC XX

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4F-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
300	14	8.72-02	5.89-02	1.67-02	3.60-03	3.32-02	4.31-02	3.94-06	9.26-06	3.24-07
300	15	8.75-02	5.89-02	1.68-02	3.61-03	3.32-02	4.32-02	3.97-06	9.28-06	3.24-07
300	16	9.08-02	5.91-02	1.72-02	3.71-03	3.36-02	4.38-02	4.07-06	9.39-06	3.28-07
300	17	1.23-01	6.06-02	2.17-02	4.67-03	3.78-02	4.99-02	5.13-06	1.05-05	3.74-07
300	18	4.19-01	7.57-02	6.68-02	1.44-02	8.67-02	1.36-01	1.58-05	2.42-05	1.02-06
300	19	1.68+00	2.38-01	5.23-01	1.12-01	9.40-01	2.20+00	1.24-04	2.62-04	1.65-05
300	20	3.29+00	1.76+00	4.83+00	1.04+00	1.27+01	3.25+01	1.14-03	3.54-03	2.44-04
300	21	3.57+00	1.25+01	3.61+01	7.77+00	1.04+02	2.68+02	8.54-03	2.90-02	2.01-03
300	22	3.61+00	3.75+01	1.09+02	2.35+01	3.18+02	8.21+02	2.58-02	8.88-02	6.16-03
300	23	3.62+00	4.71+01	1.37+02	2.95+01	4.00+02	1.03+03	3.24-02	1.11-01	7.74-03
400	14	9.15-02	7.29-02	2.30-02	4.95-03	4.38-02	5.57-02	5.44-06	1.22-05	4.18-07
400	15	9.16-02	7.29-02	2.30-02	4.96-03	4.38-02	5.58-02	5.45-06	1.22-05	4.18-07
400	16	9.49-02	7.31-02	2.36-02	5.07-03	4.43-02	5.65-02	5.57-06	1.24-05	4.24-07
400	17	1.26-01	7.48-02	2.86-02	6.16-03	4.94-02	6.37-02	6.77-06	1.38-05	4.78-07
400	18	4.08-01	9.20-02	7.98-02	1.72-02	1.07-01	1.63-01	1.89-05	3.00-05	1.22-06
400	19	1.88+00	2.76-01	6.01-01	1.29-01	1.09+00	2.54+00	1.42-04	3.03-04	1.91-05
400	20	3.42+00	2.01+00	5.59+00	1.20+00	1.49+01	3.86+01	1.32-03	4.15-03	2.90-04
400	21	3.74+00	1.47+01	4.30+01	9.25+00	1.26+02	3.28+02	1.02-02	3.52-02	2.46-03
400	22	3.79+00	4.67+01	1.38+02	2.97+01	4.09+02	1.07+03	3.26-02	1.14-01	8.00-03
400	23	3.80+00	6.00+01	1.77+02	3.81+01	5.27+02	1.37+03	4.19-02	1.47-01	1.03-02

TABLE 15

ZINC XX

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
500	14	9.41-02	8.25-02	2.80-02	6.03-03	5.17-02	6.47-02	6.62-06	1.44-05	4.85-07
500	15	9.44-02	8.25-02	2.81-02	6.04-03	5.18-02	6.47-02	6.63-06	1.44-05	4.86-07
500	16	9.73-02	8.27-02	2.86-02	6.15-03	5.23-02	6.55-02	6.76-06	1.46-05	4.91-07
500	17	1.27-01	8.45-02	3.40-02	7.31-03	5.79-02	7.33-02	8.03-06	1.62-05	5.50-07
500	18	3.96-01	1.03-01	8.79-02	1.89-02	1.21-01	1.79-01	2.08-05	3.38-05	1.34-06
500	19	1.86+00	2.97-01	6.39-01	1.38-01	1.16+00	2.70+00	1.51-04	3.23-04	2.03-05
500	20	3.50+00	2.14+00	5.97+00	1.28+00	1.60+01	4.20+01	1.41-03	4.46-03	3.15-04
500	21	3.85+00	1.59+01	4.69+01	1.01+01	1.39+02	3.64+02	1.11-02	3.88-02	2.73-03
500	22	3.91+00	5.29+01	1.58+02	3.39+01	4.73+02	1.24+03	3.72-02	1.32-01	9.30-03
500	23	3.92+00	6.93+01	2.07+02	4.44+01	6.21+02	1.63+03	4.88-02	1.73-01	1.22-02
600	14	9.58-02	8.95-02	3.20-02	6.89-03	5.78-02	7.13-02	7.57-06	1.61-05	5.35-07
600	15	9.61-02	8.95-02	3.21-02	6.90-03	5.78-02	7.14-02	7.58-06	1.61-05	5.35-07
600	16	9.89-02	8.97-02	3.26-02	7.02-03	5.84-02	7.21-02	7.71-06	1.63-05	5.41-07
600	17	1.27-01	9.15-02	3.81-02	8.20-03	6.43-02	8.02-02	9.00-06	1.80-05	6.02-07
600	18	3.85-01	1.10-01	9.30-02	2.00-02	1.31-01	1.88-01	2.20-05	3.64-05	1.41-06
600	19	1.83+00	3.09-01	6.57-01	1.41-01	1.19+00	2.76+00	1.55-04	3.32-04	2.07-05
600	20	3.54+00	2.20+00	6.16+00	1.32+00	1.65+01	4.38+01	1.45-03	4.61-03	3.28-04
600	21	3.92+00	1.65+01	4.91+01	1.06+01	1.46+02	3.86+02	1.16-02	4.09-02	2.90-03
600	22	3.98+00	5.72+01	1.72+02	3.69+01	5.18+02	1.36+03	4.05-02	1.45-01	1.02-02
600	23	4.00+00	7.62+01	2.29+02	4.92+01	6.92+02	1.82+03	5.41-02	1.93-01	1.37-02

TABLE 16

ZINC XX

INTENSITY RATIO I(n L - n'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4F-4S	4D-4P	4F-4D
800	14	9.80-02	9.87-02	3.80-02	8.18-03	6.64-02	8.03-02	8.99-06	1.85-05	6.02-07
800	15	9.83-02	9.87-02	3.81-02	8.19-03	6.65-02	8.04-02	9.00-06	1.86-05	6.03-07
800	16	1.01-01	9.89-02	3.86-02	8.31-03	6.71-02	8.12-02	9.13-06	1.87-05	6.09-07
800	17	1.26-01	1.01-01	4.41-02	9.48-03	7.33-02	8.94-02	1.04-05	2.05-05	6.71-07
800	18	3.65-01	1.19-01	9.87-02	2.12-02	1.42-01	1.97-01	2.33-05	3.96-05	1.48-06
800	19	1.76+00	3.19-01	6.62-01	1.42-01	1.20+00	2.73+00	1.56-04	3.35-04	2.05-05
800	20	3.58+00	2.23+00	6.23+00	1.34+00	1.67+01	4.48+01	1.47-03	4.67-03	3.36-04
800	21	4.01+00	1.70+01	5.09+01	1.09+01	1.53+02	4.06+02	1.20-02	4.27-02	3.05-03
800	22	4.08+00	6.25+01	1.89+02	4.06+01	5.76+02	1.52+03	4.46-02	1.61-01	1.14-02
800	23	4.10+00	8.58+01	2.59+02	5.58+01	7.92+02	2.09+03	6.13-02	2.21-01	1.57-02
1000	14	9.94-02	1.05-01	4.22-02	9.09-03	7.23-02	8.61-02	9.98-06	2.02-05	6.46-07
1000	15	9.96-02	1.05-01	4.23-02	9.10-03	7.23-02	8.62-02	10.00-06	2.02-05	6.47-07
1000	16	1.02-01	1.05-01	4.28-02	9.21-03	7.30-02	8.70-02	1.01-05	2.04-05	6.53-07
1000	17	1.26-01	1.07-01	4.81-02	1.03-02	7.92-02	9.51-02	1.14-05	2.21-05	7.14-07
1000	18	3.49-01	1.25-01	1.01-01	2.18-02	1.48-01	2.00-01	2.39-05	4.12-05	1.50-06
1000	19	1.70+00	3.19-01	6.51-01	1.40-01	1.18+00	2.64+00	1.54-04	3.28-04	1.98-05
1000	20	3.60+00	2.20+00	6.13+00	1.32+00	1.64+01	4.43+01	1.45-03	4.59-03	3.33-04
1000	21	4.06+00	1.70+01	5.10+01	1.10+01	1.54+02	4.10+02	1.20-02	4.29-02	3.08-03
1000	22	4.14+00	6.54+01	1.98+02	4.27+01	6.08+02	1.61+03	4.69-02	1.70-01	1.21-02
1000	23	4.16+00	9.20+01	2.79+02	6.01+01	8.58+02	2.27+03	6.60-02	2.39-01	1.71-02

TABLE 17

KRYPTON XXVI

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
50	15	2.17-02	1.34-05	1.84-06	3.41-07	2.99-06	2.68-06	2.05-10	3.36-10	1.29-11
50	16	2.23-02	1.34-05	1.89-06	3.49-07	3.02-06	2.56-06	2.10-10	3.39-10	1.23-11
50	17	2.82-02	1.36-05	2.35-06	4.35-07	3.26-06	2.65-06	2.62-10	3.66-10	1.28-11
50	18	8.24-02	1.61-05	7.01-06	1.30-06	6.11-06	6.43-06	7.81-10	6.87-10	3.09-11
50	19	3.56-01	4.16-05	5.56-05	1.03-05	5.51-05	9.00-05	6.19-09	6.19-09	4.33-10
50	20	6.30-01	2.74-04	5.41-04	1.00-04	7.54-04	1.35-03	6.03-08	8.47-08	6.48-09
50	21	6.84-01	1.96-03	4.37-03	8.10-04	7.11-03	1.30-02	4.87-07	7.99-07	6.28-08
50	22	6.90-01	8.05-03	1.84-02	3.42-03	3.12-02	5.86-02	2.06-06	3.51-06	2.82-07
50	23	6.91-01	1.20-02	2.77-02	5.13-03	4.71-02	8.87-02	3.09-06	5.29-06	4.27-07
51	24	6.91-01	1.27-02	2.92-02	5.40-03	4.96-02	9.35-02	3.25-06	5.57-06	4.50-07
100	15	4.54-02	1.65-03	3.18-04	5.89-05	6.55-04	7.41-04	3.55-08	7.36-08	3.56-09
100	16	4.63-02	1.65-03	3.24-04	5.99-05	6.59-04	7.46-04	3.61-08	7.40-08	3.59-09
100	17	5.58-02	1.67-03	3.79-04	7.01-05	6.99-04	7.99-04	4.22-08	7.85-08	3.84-09
100	18	1.44-01	1.89-03	9.31-04	1.72-04	1.14-03	1.46-03	1.04-07	1.29-07	7.03-09
100	19	6.60-01	4.17-03	6.63-03	1.23-03	8.40-03	1.59-02	7.39-07	9.44-07	7.64-08
100	20	1.33+00	2.54-02	6.37-02	1.18-02	1.18-01	2.54-01	7.09-06	1.32-05	1.22-06
100	21	1.49+00	1.86-01	5.35-01	9.90-02	1.17+00	2.57+00	5.96-05	1.31-04	1.23-05
100	22	1.51+00	8.98-01	2.66+00	4.93-01	6.04+00	1.35+01	2.97-04	6.79-04	6.49-05
100	23	1.51+00	1.52+00	4.53+00	8.38-01	1.03+01	2.31+01	5.05-04	1.16-03	1.11-04
100	24	1.51+00	1.64+00	4.87+00	9.02-01	1.11+01	2.49+01	5.43-04	1.25-03	1.20-04

TABLE 1B

KRYPTON XXVI

INTENSITY RATIO I(N L = 'L')/I(3P = 3S)

T(EV)	LOG N	3D-3P	4S-3P	4F-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
200	15	6.49-02	1.77-02	4.44-03	8.23-04	9.58-03	1.14-02	4.95-07	1.08-06	5.48-08
200	16	6.60-02	1.77-02	4.49-03	8.32-04	9.63-03	1.14-02	5.01-07	1.08-06	5.50-08
200	17	7.64-02	1.79-02	5.00-03	9.26-04	1.01-02	1.21-02	5.57-07	1.13-06	5.80-08
200	18	1.75-01	1.96-02	1.01-02	1.87-03	1.49-02	1.95-02	1.13-06	1.68-06	8.37-08
200	19	6.21-01	3.79-02	6.26-02	1.16-02	8.87-02	1.74-01	6.97-06	9.97-06	8.35-07
200	20	1.89+00	2.13-01	5.93-01	1.10-01	1.24+00	2.96+00	6.61-05	1.40-04	1.42-05
200	21	2.19+00	1.58+00	5.15+00	9.53-01	1.30+01	3.12+01	5.74-04	1.46-03	1.50-04
200	22	2.23+00	8.69+00	2.93+01	5.42+00	7.69+01	1.87+02	3.26-03	8.64-03	9.01-04
200	23	2.23+00	1.68+01	5.68+01	1.05+01	1.50+02	3.66+02	6.33-03	1.68-02	1.76-03
200	24	2.23+00	1.85+01	6.28+01	1.16+01	1.66+02	4.05+02	6.99-03	1.86-02	1.95-03
300	15	7.34-02	3.81-02	1.12-02	2.07-03	2.33-02	2.76-02	1.24-06	2.62-06	1.33-07
300	16	7.45-02	3.81-02	1.13-02	2.09-03	2.34-02	2.78-02	1.26-06	2.63-06	1.33-07
300	17	8.46-02	3.84-02	1.23-02	2.27-03	2.44-02	2.91-02	1.37-06	2.74-06	1.40-07
300	18	1.81-01	4.17-02	2.21-02	4.10-03	3.46-02	4.44-02	2.47-06	3.89-06	2.13-07
300	19	6.48-01	7.58-02	1.24-01	2.29-02	1.82-01	3.54-01	1.38-05	2.05-05	1.70-06
300	20	2.09+00	4.07-01	1.16+00	2.15-01	2.52+00	6.21+00	1.29-04	2.84-04	2.99-05
300	21	2.48+00	3.03+00	1.03+01	1.90+00	2.70+01	6.73+01	1.14-03	3.04-03	3.23-04
300	22	2.53+00	1.77+01	6.22+01	1.15+01	1.71+02	4.30+02	6.93-03	1.93-02	2.07-03
300	23	2.54+00	3.70+01	1.31+02	2.42+01	3.62+02	9.11+02	1.46-02	4.07-02	4.38-03
300	24	2.54+00	4.16+01	1.47+02	2.72+01	4.08+02	1.02+03	1.64-02	4.58-02	4.93-03

TABLE 19

KRYPTON XXVI

INTENSITY RATIO I(3P - 'L')/I(3P - 3S)

T(EV)	LAG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
400	15	7.83-02	5.53-02	1.81-02	3.35-03	3.64-02	4.26-02	2.02-06	4.09-06	2.05-07
400	16	7.93-02	5.53-02	1.82-02	3.38-03	3.65-02	4.28-02	2.03-06	4.10-06	2.06-07
400	17	8.90-02	5.57-02	1.96-02	3.62-03	3.79-02	4.46-02	2.18-06	4.26-06	2.14-07
400	18	1.82-01	6.01-02	3.28-02	6.07-03	5.24-02	6.59-02	3.65-06	5.89-06	3.17-07
400	19	8.45-01	1.05-01	1.69-01	3.13-02	2.55-01	4.86-01	1.88-05	2.86-05	2.34-06
400	20	2.19+00	5.47-01	1.57+00	2.91-01	3.47+00	8.70+00	1.75-04	3.91-04	4.18-05
400	21	2.64+00	4.97+00	1.40+01	2.60+00	3.78+01	9.58+01	1.56-03	4.25-03	4.61-04
400	22	2.70+00	2.47+01	8.88+01	1.64+01	2.51+02	6.38+02	9.89-03	2.82-02	3.07-03
400	23	2.71+00	5.47+01	1.97+02	3.65+01	5.60+02	1.43+03	2.20-02	6.29-02	6.87-03
400	24	2.71+00	6.23+01	2.25+02	4.16+01	6.39+02	1.63+03	2.50-02	7.18-02	7.83-03
500	15	6.14-02	6.87-02	2.45-02	4.53-03	4.75-02	5.49-02	2.73-06	5.34-06	2.64-07
500	16	6.23-02	6.88-02	2.46-02	4.56-03	4.77-02	5.51-02	2.74-06	5.36-06	2.65-07
500	17	6.96-02	6.93-02	2.62-02	4.84-03	4.94-02	5.73-02	2.91-06	5.55-06	2.75-07
500	18	1.31-01	7.43-02	4.16-02	7.70-03	6.70-02	8.26-02	4.63-06	7.53-06	3.97-07
500	19	5.32-01	1.27-01	2.00-01	3.70-02	3.07-01	5.74-01	2.23-05	3.45-05	2.76-06
500	20	2.24+00	6.42-01	1.84+00	3.41-01	4.11+00	1.04+01	2.05-04	4.62-04	5.01-05
500	21	2.74+00	4.77+00	1.66+01	3.08+00	4.53+01	1.16+02	1.85-03	5.09-03	5.59-04
500	22	2.81+00	2.98+01	1.08+02	2.01+01	3.11+02	7.98+02	1.21-02	3.49-02	3.84-03
500	23	2.82+00	6.98+01	2.51+02	4.65+01	7.25+02	1.86+03	2.80-02	8.14-02	8.96-03
500	24	2.82+00	7.93+01	2.90+02	5.37+01	8.36+02	2.15+03	3.23-02	9.39-02	1.03-02

TABLE 20

KRYPTON XXVI

INTENSITY RATIO I(n L = n'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4F-3S	4F-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
750	15	8.59-02	9.12-02	3.72-02	6.89-03	6.79-02	7.62-02	4.15-06	7.63-06	3.66-07
750	16	8.67-02	9.12-02	3.74-02	6.92-03	6.81-02	7.65-02	4.17-06	7.66-06	3.68-07
750	17	9.51-02	9.18-02	3.92-02	7.25-03	7.03-02	7.92-02	4.37-06	7.90-06	3.81-07
750	18	1.76-01	9.77-02	5.72-02	1.06-02	9.25-02	1.10-01	6.37-06	1.04-05	5.27-07
750	19	7.92-01	1.59-01	2.42-01	4.48-02	3.81-01	6.82-01	2.70-05	4.28-05	3.28-06
750	20	2.29+00	7.65-01	2.18+00	4.04-01	4.92+00	1.27+01	2.43-04	5.52-04	6.09-05
750	21	2.87+00	5.69+00	2.00+01	3.71+00	5.54+01	1.45+02	2.23-03	6.23-03	6.97-04
750	22	2.95+00	3.71+01	1.37+02	2.54+01	4.01+02	1.04+03	1.53-02	4.50-02	5.02-03
750	23	2.97+00	9.28+01	3.45+02	6.38+01	1.01+03	2.64+03	3.84-02	1.14-01	1.27-02
750	24	2.97+00	1.69+02	4.06+02	7.52+01	1.20+03	3.11+03	4.53-02	1.34-01	1.50-02
1000	15	8.82-02	1.04-01	4.63-02	8.58-03	8.13-02	8.94-02	5.16-06	9.14-06	4.30-07
1000	16	8.90-02	1.05-01	4.65-02	8.61-03	8.15-02	8.96-02	5.18-06	9.16-06	4.31-07
1000	17	9.67-02	1.05-01	4.84-02	8.95-03	8.39-02	9.25-02	5.39-06	9.43-06	4.45-07
1000	18	1.72-01	1.11-01	6.70-02	1.24-02	1.08-01	1.25-01	7.47-06	1.21-05	5.99-07
1000	19	7.53-01	1.75-01	2.59-01	4.79-02	4.13-01	7.13-01	2.89-05	4.65-05	3.43-06
1000	20	2.29+00	8.11-01	2.29+00	4.24-01	5.17+00	1.34+01	2.55-04	5.81-04	6.44-05
1000	21	2.94+00	6.01+00	2.12+01	3.93+00	5.91+01	1.57+02	2.36-03	6.65-03	7.53-04
1000	22	3.03+00	4.04+01	1.50+02	2.79+01	4.44+02	1.16+03	1.68-02	4.98-02	5.59-03
1000	23	3.05+00	1.07+02	4.01+02	7.42+01	1.19+03	3.11+03	4.46-02	1.34-01	1.50-02
1000	24	3.05+00	1.28+02	4.81+02	8.90+01	1.43+03	3.74+03	5.36-02	1.60-01	1.80-02

TABLE 21

KRYPTON XXVI

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4F-3S	4F-3D	4D-3P	4F-3D	4P-4S	4F-4P	4F-4D
1250	15	8.96-02	1.13-01	5.30-02	9.82-03	9.06-02	9.81-02	5.91-06	1.02-05	4.72-07
1250	16	9.04-02	1.13-01	5.32-02	9.85-03	9.09-02	9.84-02	5.93-06	1.02-05	4.73-07
1250	17	9.75-02	1.14-01	5.51-02	1.02-02	9.33-02	1.01-01	6.13-06	1.05-05	4.87-07
1250	18	1.67-01	1.20-01	7.37-02	1.36-02	1.18-01	1.34-01	8.21-06	1.33-05	6.43-07
1250	19	7.19-01	1.84-01	2.65-01	4.91-02	4.27-01	7.14-01	2.95-05	4.80-05	3.43-06
1250	20	2.27+00	8.24-01	2.30+00	4.26-01	5.21+00	1.35+01	2.57-04	5.85-04	6.49-05
1250	21	2.98+00	6.10+00	2.15+01	3.98+00	6.01+01	1.60+02	2.40-03	6.76-03	7.72-04
1250	22	3.08+00	4.18+01	1.56+02	2.90+01	4.64+02	1.22+03	1.74-02	5.21-02	5.87-03
1250	23	3.09+00	1.16+02	4.36+02	8.08+01	1.30+03	3.42+03	4.86-02	1.46-01	1.64-02
1250	24	3.10+00	1.41+02	5.32+02	9.84+01	1.59+03	4.17+03	5.92-02	1.78-01	2.01-02
1500	15	9.06-02	1.19-01	5.81-02	1.08-02	9.75-02	1.04-01	6.47-06	1.09-05	5.01-07
1500	16	9.13-02	1.19-01	5.83-02	1.08-02	9.77-02	1.05-01	6.49-06	1.10-05	5.03-07
1500	17	9.89-02	1.20-01	6.01-02	1.11-02	1.00-01	1.07-01	6.70-06	1.13-05	5.17-07
1500	18	1.63-01	1.26-01	7.84-02	1.45-02	1.25-01	1.39-01	8.74-06	1.41-05	6.71-07
1500	19	6.90-01	1.89-01	2.66-01	4.93-02	4.32-01	7.03-01	2.97-05	4.85-05	3.38-06
1500	20	2.25+00	8.23-01	2.28+00	4.21-01	5.14+00	1.33+01	2.54-04	5.78-04	6.40-05
1500	21	3.00+00	6.07+00	2.14+01	3.96+00	5.99+01	1.61+02	2.38-03	6.73-03	7.73-04
1500	22	3.11+00	4.23+01	1.59+02	2.94+01	4.72+02	1.25+03	1.77-02	5.30-02	5.99-03
1500	23	3.13+00	1.22+02	4.60+02	8.51+01	1.38+03	3.63+03	5.12-02	1.55-01	1.74-02
1500	24	3.13+00	1.50+02	5.68+02	1.05+02	1.70+03	4.49+03	6.33-02	1.91-01	2.16-02

TABLE 22

MOLYBDENUM XXXII

INTENSITY RATIO I(N L - N 'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4P-4S	4D-4P	4F-4D
100	15	3.46-02	1.64-04	2.66-05	5.31-06	5.71-05	5.96-05	2.19-09	3.33-09	2.15-10
100	16	3.49-02	1.64-04	2.68-05	5.35-06	5.73-05	5.96-05	2.21-09	3.34-09	2.15-10
100	17	3.78-02	1.65-04	2.88-05	5.74-06	5.88-05	6.14-05	2.37-09	3.43-09	2.22-10
100	18	6.62-02	1.74-04	4.86-05	9.69-06	7.45-05	8.13-05	4.00-09	4.34-09	2.94-10
100	19	2.75-01	2.68-04	2.51-04	5.00-05	2.92-04	4.45-04	2.06-08	1.71-08	1.61-09
100	20	7.42-01	1.26-03	2.31-03	4.61-04	3.83-03	7.62-03	1.90-07	2.23-07	2.75-08
100	21	9.12-01	9.78-03	2.04-02	4.07-03	4.39-02	8.78-02	1.68-06	2.56-06	3.17-07
100	22	9.34-01	6.56-02	1.43-01	2.86-02	3.43-01	7.08-01	1.18-05	2.00-05	2.56-06
100	23	9.36-01	1.92-01	4.23-01	8.45-02	1.03+00	2.15+00	3.48-05	6.02-05	7.77-06
100	24	9.36-01	2.40-01	5.29-01	1.05-01	1.29+00	2.70+00	4.35-05	7.54-05	9.74-06
200	15	5.43-02	5.85-03	1.25-03	2.49-04	3.01-03	3.46-03	1.03-07	1.75-07	1.25-08
200	16	5.47-02	5.86-03	1.26-03	2.51-04	3.01-03	3.47-03	1.03-07	1.76-07	1.25-08
200	17	5.82-02	5.88-03	1.32-03	2.63-04	3.07-03	3.55-03	1.08-07	1.79-07	1.28-08
200	18	9.27-02	6.12-03	1.95-03	3.89-04	3.69-03	4.39-03	1.60-07	2.15-07	1.59-08
200	19	3.66-01	8.61-03	8.36-03	1.67-03	1.17-02	1.86-02	6.88-07	6.81-07	6.73-08
200	20	1.13+00	3.52-02	7.39-02	1.47-02	1.43-01	3.20-01	6.08-06	8.35-06	1.16-06
200	21	1.48+00	2.68-01	6.59-01	1.32-01	1.69+00	3.87+00	5.42-05	9.86-05	1.40-05
200	22	1.53+00	1.91+00	4.94+00	9.86-01	1.43+01	3.32+01	4.67-04	8.32-04	1.20-04
200	23	1.53+00	6.63+00	1.74+01	3.47+00	5.12+01	1.20+02	1.43-03	2.98-03	4.34-04
200	24	1.53+00	8.92+00	2.34+01	4.66+00	6.90+01	1.62+02	1.92-03	4.02-03	5.87-04

TABLE 23

MOLYBDENUM XXXII

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4F-3P	4F-3D	4F-4S	4D-4F	4F-4D
300	15	6.30-02	1.89-02	4.67-03	9.32-04	1.12-02	1.31-02	3.84-07	6.54-07	4.74-08
300	16	6.34-02	1.89-02	4.69-03	9.36-04	1.12-02	1.32-02	3.86-07	6.55-07	4.75-08
300	17	6.69-02	1.96-02	4.87-03	9.72-04	1.14-02	1.34-02	4.01-07	6.66-07	4.84-08
300	18	1.01-01	1.96-02	6.71-03	1.34-03	1.34-02	1.61-02	5.52-07	7.81-07	5.82-08
300	19	3.84-01	2.65-02	2.54-02	5.07-03	3.80-02	6.01-02	2.09-06	2.22-06	2.17-07
300	20	1.27+00	1.00-01	2.17-01	4.34-02	4.41-01	1.02+00	1.79-05	2.57-05	3.68-06
300	21	1.73+00	7.54-01	1.95+00	3.90-01	5.29+00	1.27+01	1.61-04	3.09-04	4.59-05
300	22	1.80+00	5.51+00	1.51+01	3.01+00	4.63+01	1.12+02	1.24-03	2.73-03	4.06-04
300	23	1.81+00	2.10+01	5.83+01	1.16+01	1.83+02	4.47+02	4.79-03	1.06-02	1.61-03
300	24	1.81+00	2.96+01	8.23+01	1.64+01	2.59+02	6.34+02	6.77-03	1.51-02	2.29-03
400	15	6.81-02	3.36-02	9.23-03	1.84-03	2.16-02	2.53-02	7.60-07	1.26-06	9.13-08
400	16	6.84-02	3.36-02	9.26-03	1.85-03	2.17-02	2.53-02	7.62-07	1.26-06	9.15-08
400	17	7.18-02	3.37-02	9.56-03	1.91-03	2.20-02	2.58-02	7.87-07	1.28-06	9.31-08
400	18	1.05-01	3.48-02	1.26-02	2.51-03	2.54-02	3.04-02	1.04-06	1.48-06	1.10-07
400	19	3.85-01	4.58-02	4.33-02	8.64-03	6.73-02	1.04-01	3.56-06	3.93-06	3.77-07
400	20	1.33+00	1.64-01	3.60-01	7.19-02	7.45-01	1.75+00	2.96-05	4.34-05	6.32-06
400	21	1.87+00	1.23+00	3.26+00	6.50-01	9.04+00	2.23+01	2.68-04	5.27-04	8.04-05
400	22	1.96+00	9.09+00	2.56+01	5.12+00	8.10+01	2.01+02	2.11-03	4.72-03	7.26-04
400	23	1.96+00	3.69+01	1.05+02	2.10+01	3.40+02	8.50+02	8.66-03	1.98-02	3.07-03
400	24	1.97+00	5.39+01	1.54+02	3.08+01	5.00+02	1.25+03	1.27-02	2.91-02	4.52-03

TABLE 24

MOLYBDENUM XXXII

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4F-3D	4F-3P	4F-3D	4P-4S	4D-4P	4F-4D
500	15	7.15-02	4.72-02	1.41-02	2.81-03	3.21-02	3.72-02	1.16-06	1.87-06	1.34-07
500	16	7.18-02	4.72-02	1.41-02	2.82-03	3.21-02	3.73-02	1.16-06	1.87-06	1.35-07
500	17	7.51-02	4.74-02	1.45-02	2.90-03	3.26-02	3.79-02	1.19-06	1.90-06	1.37-07
500	18	1.07-01	4.88-02	1.85-02	3.69-03	3.73-02	4.42-02	1.52-06	2.17-06	1.60-07
500	19	3.81-01	6.31-02	5.90-02	1.18-02	9.40-02	1.43-01	4.85-06	5.48-06	5.16-07
500	20	1.36+00	2.17-01	4.78-01	9.53-02	1.00+00	2.36+00	3.93-05	5.83-05	8.53-06
500	21	1.96+00	1.61+00	4.34+00	8.66-01	1.22+01	3.16+01	3.57-04	7.11-04	1.10-04
500	22	2.05+00	1.21+01	3.46+01	6.91+00	1.11+02	2.80+02	2.85-03	6.49-03	1.01-03
500	23	2.06+00	5.12+01	1.49+02	2.97+01	4.90+02	1.24+03	1.22-02	2.86-02	4.48-03
500	24	2.07+00	7.71+01	2.24+02	4.48+01	7.41+02	1.88+03	1.84-02	4.32-02	6.78-03
600	15	7.39-02	5.90-02	1.88-02	3.76-03	4.17-02	4.80-02	1.55-06	2.43-06	1.73-07
600	16	7.42-02	5.90-02	1.89-02	3.77-03	4.17-02	4.81-02	1.55-06	2.43-06	1.74-07
600	17	7.74-02	5.92-02	1.93-02	3.86-03	4.23-02	4.88-02	1.59-06	2.47-06	1.76-07
600	18	1.09-01	6.08-02	2.41-02	4.80-03	4.81-02	5.65-02	1.98-06	2.81-06	2.04-07
600	19	3.76-01	7.77-02	7.19-02	1.44-02	1.17-01	1.74-01	5.92-06	6.81-06	6.29-07
600	20	1.38+00	2.59-01	5.69-01	1.14-01	1.20+00	2.84+00	4.68-05	7.00-05	1.03-05
600	21	2.02+00	1.91+00	5.19+00	1.03+00	1.47+01	3.74+01	4.27-04	8.58-04	1.35-04
600	22	2.12+00	1.44+01	4.18+01	8.35+00	1.36+02	3.45+02	3.44-03	7.93-03	1.25-03
600	23	2.13+00	6.34+01	1.86+02	3.71+01	6.21+02	1.58+03	1.53-02	3.62-02	5.72-03
600	24	2.13+00	9.78+01	2.88+02	5.74+01	9.63+02	2.46+03	2.37-02	5.61-02	8.87-03

TABLE 25

MOLYBDENUM XXXII

INTENSITY RATIO I(N L - 1'L')/I(3P - 3S)

T(EV)	LOG T	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4F-4S	4D-4P	4F-4D
800	15	7.72-02	7.75-02	2.74-02	5.47-03	5.80-02	6.56-02	2.26-06	3.38-06	2.37-07
800	16	7.75-02	7.75-02	2.75-02	5.48-03	5.80-02	6.56-02	2.26-06	3.38-06	2.37-07
800	17	8.05-02	7.77-02	2.80-02	5.60-03	5.88-02	6.65-02	2.31-06	3.43-06	2.40-07
800	18	1.10-01	7.97-02	3.37-02	6.73-03	6.62-02	7.61-02	2.77-06	3.86-06	2.75-07
800	19	3.64-01	9.99-02	9.12-02	1.82-02	1.52-01	2.19-01	7.51-06	8.84-06	7.89-07
800	20	1.38+00	3.17-01	6.91-01	1.38-01	1.47+00	3.48+00	5.69-05	8.59-05	1.26-05
800	21	2.09+00	2.32+00	6.34+00	1.26+00	1.81+01	4.69+01	5.22-04	1.06-03	1.69-04
800	22	2.21+00	1.77+01	5.19+01	1.04+01	1.71+02	4.40+02	4.27-03	9.99-03	1.59-03
800	23	2.22+00	8.18+01	2.44+02	4.88+01	8.26+02	2.13+03	2.01-02	4.82-02	7.69-03
800	24	2.22+00	1.31+02	3.92+02	7.82+01	1.33+03	3.43+03	3.22-02	7.77-02	1.24-02
1000	15	7.94-02	9.10-02	3.47-02	6.92-03	7.07-02	7.87-02	2.85-06	4.12-06	2.84-07
1000	16	7.96-02	9.10-02	3.47-02	6.93-03	7.08-02	7.88-02	2.86-06	4.13-06	2.85-07
1000	17	8.24-02	9.12-02	3.54-02	7.06-03	7.16-02	7.98-02	2.91-06	4.18-06	2.88-07
1000	18	1.10-01	9.34-02	4.15-02	8.29-03	8.00-02	9.05-02	3.42-06	4.67-06	3.27-07
1000	19	3.52-01	1.15-01	1.04-01	2.08-02	1.76-01	2.46-01	8.58-06	1.03-05	8.89-07
1000	20	1.37+00	3.53-01	7.61-01	1.52-01	1.63+00	3.84+00	6.26-05	9.51-05	1.39-05
1000	21	2.13+00	2.56+00	7.01+00	1.40+00	2.01+01	5.28+01	5.77-04	1.17-03	1.91-04
1000	22	2.26+00	1.96+01	5.81+01	1.16+01	1.93+02	5.00+02	4.78-03	1.13-02	1.81-03
1000	23	2.29+00	9.45+01	2.84+02	5.66+01	9.70+02	2.52+03	2.33-02	5.66-02	9.09-03
1000	24	2.28+00	1.56+02	4.71+02	9.40+01	1.62+03	4.19+03	3.88-02	9.42-02	1.51-02

TABLE 26

MOLYBDENUM XXXII

INTENSITY RATIO I(N L - N'L')/I(3P - 3S)

T(EV)	LOG N	3D-3P	4S-3P	4P-3S	4P-3D	4D-3P	4F-3D	4F-4S	4D-4P	4F-4D
1500	15	8.25-02	1.12-01	4.80-02	9.58-03	9.24-02	1.00-02	3.95-06	5.39-06	3.61-07
1500	16	8.27-02	1.12-01	4.81-02	9.60-03	9.25-02	1.00-01	3.96-06	5.39-06	3.61-07
1500	17	8.52-02	1.12-01	4.87-02	9.73-03	9.34-02	1.01-01	4.01-06	5.45-06	3.65-07
1500	18	1.09-01	1.15-01	5.53-02	1.10-02	1.03-01	1.13-01	4.55-06	6.01-06	4.08-07
1500	19	3.27-01	1.38-01	1.22-01	2.44-02	2.11-01	2.79-01	1.01-05	1.23-05	1.01-06
1500	20	1.33+00	3.93-01	8.26-01	1.65-01	1.79+00	4.13+00	6.80-05	1.04-04	1.49-05
1500	21	2.18+00	2.79+00	7.66+00	1.53+00	2.21+01	5.90+01	6.30-04	1.29-03	2.13-04
1500	22	2.34+00	2.17+01	6.48+01	1.29+01	2.17+02	5.70+02	5.33-03	1.27-02	2.06-03
1500	23	2.36+00	1.12+02	3.39+02	6.77+01	1.17+03	3.07+03	2.79-02	6.85-02	1.11-02
1500	24	2.36+00	1.97+02	5.99+02	1.20+02	2.08+03	5.44+03	4.93-02	1.21-01	1.97-02
2000	15	8.41-02	1.24-01	5.69-02	1.13-02	1.06-01	1.12-01	4.68-06	6.16-06	4.06-07
2000	16	8.43-02	1.24-01	5.69-02	1.14-02	1.06-01	1.12-01	4.68-06	6.17-06	4.06-07
2000	17	8.65-02	1.24-01	5.76-02	1.15-02	1.07-01	1.13-01	4.74-06	6.23-06	4.10-07
2000	18	1.08-01	1.27-01	6.41-02	1.28-02	1.17-01	1.25-01	5.28-06	6.81-06	4.53-07
2000	19	3.07-01	1.50-01	1.30-01	2.60-02	2.27-01	2.88-01	1.07-05	1.32-05	1.04-06
2000	20	1.28+00	4.04-01	8.30-01	1.66-01	1.80+00	4.08+00	6.83-05	1.05-04	1.47-05
2000	21	2.20+00	2.82+00	7.72+00	1.54+00	2.23+01	6.01+01	6.35-04	1.30-03	2.17-04
2000	22	2.38+00	2.21+01	6.61+01	1.32+01	2.23+02	5.88+02	5.44-03	1.30-02	2.12-03
2000	23	2.39+00	1.19+02	3.63+02	7.25+01	1.27+03	3.32+03	2.99-02	7.38-02	1.20-02
2000	24	2.40+00	2.20+02	6.73+02	1.34+02	2.35+03	6.18+03	5.54-02	1.37-01	2.23-02

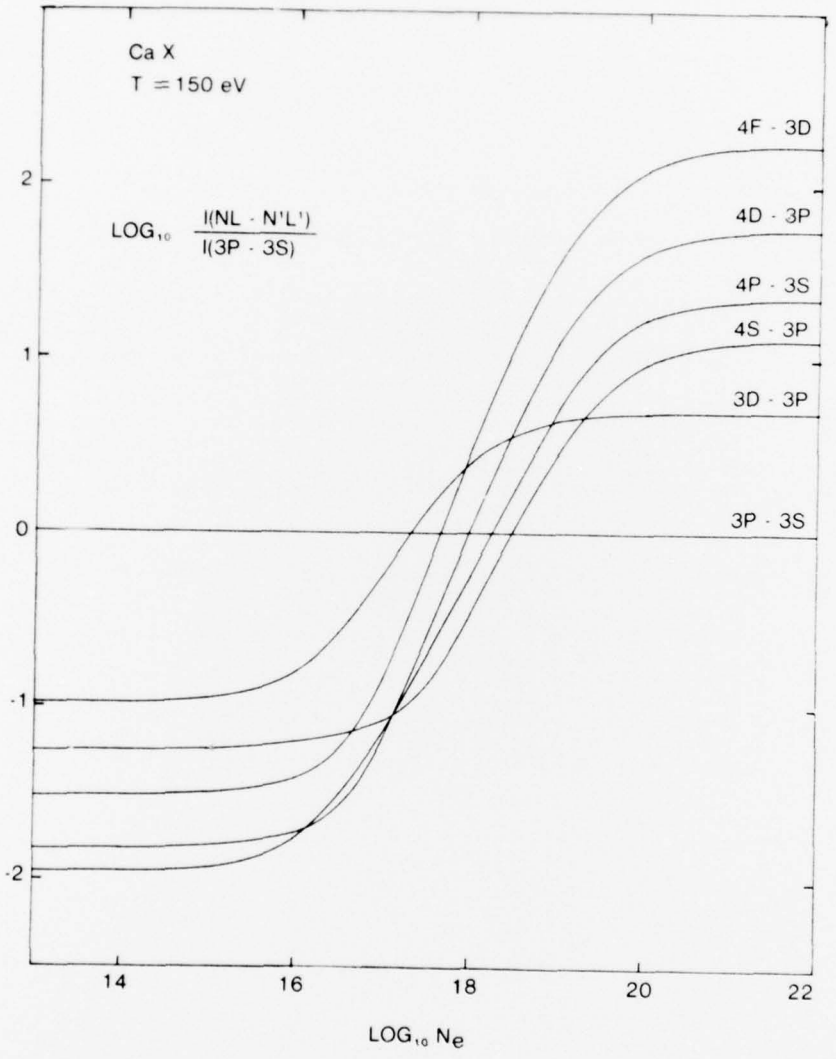
Ca X
T = 150 eV
LOG10 I(NL - N'L') / I(3P - 3S)
4F - 3D
4D - 3P
4P - 3S
4S - 3P
3D - 3P
3P - 3S
2
1
0
-1
-2
14
16
18
20
22
LOG10 Ne

Figure 1

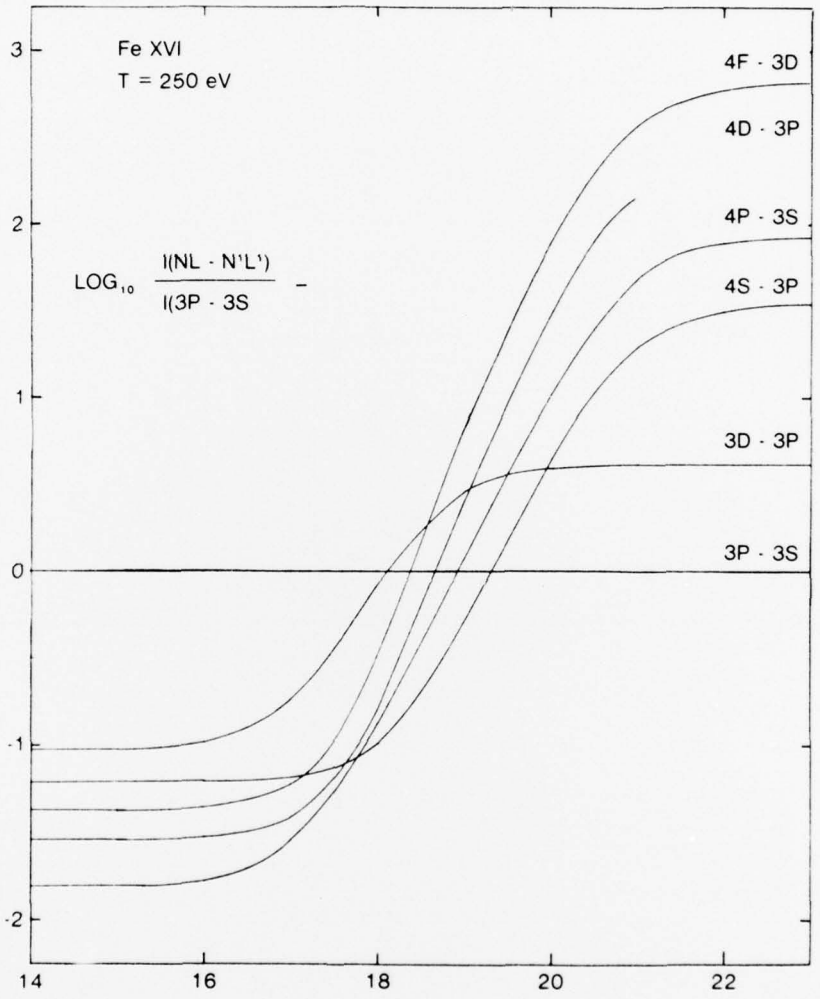
Fe XVI
T = 250 eV
4F - 3D
4D - 3P
4P - 3S
4S - 3P
3D - 3P
3P - 3S
LOG10 I(NL - N'L') / I(3P - 3S)
3
2
1
0
-1
-2
14
16
18
20
22
LOG10 Ne

Figure 2

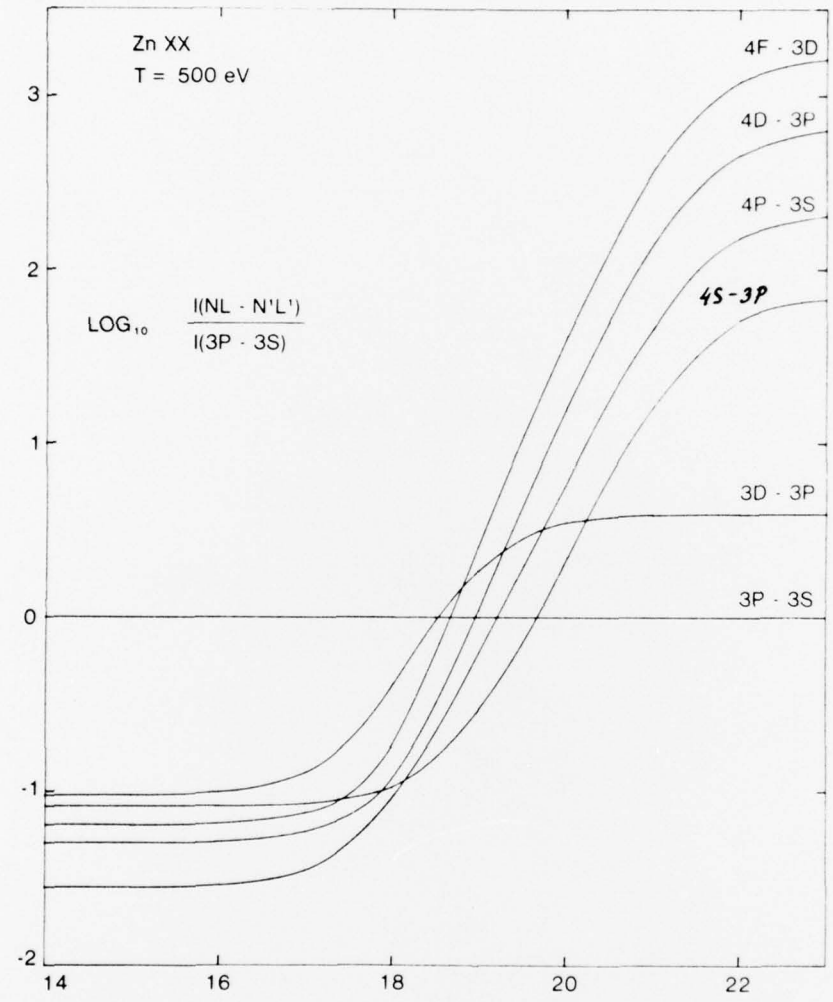
Zn XX
T = 500 eV
4F - 3D
4D - 3P
4P - 3S
4S - 3P
3D - 3P
3P - 3S
LOG10 I(NL - N'L') / I(3P - 3S)
3
2
1
0
-1
-2
14
16
18
20
22
LOG10 Ne

Figure 3

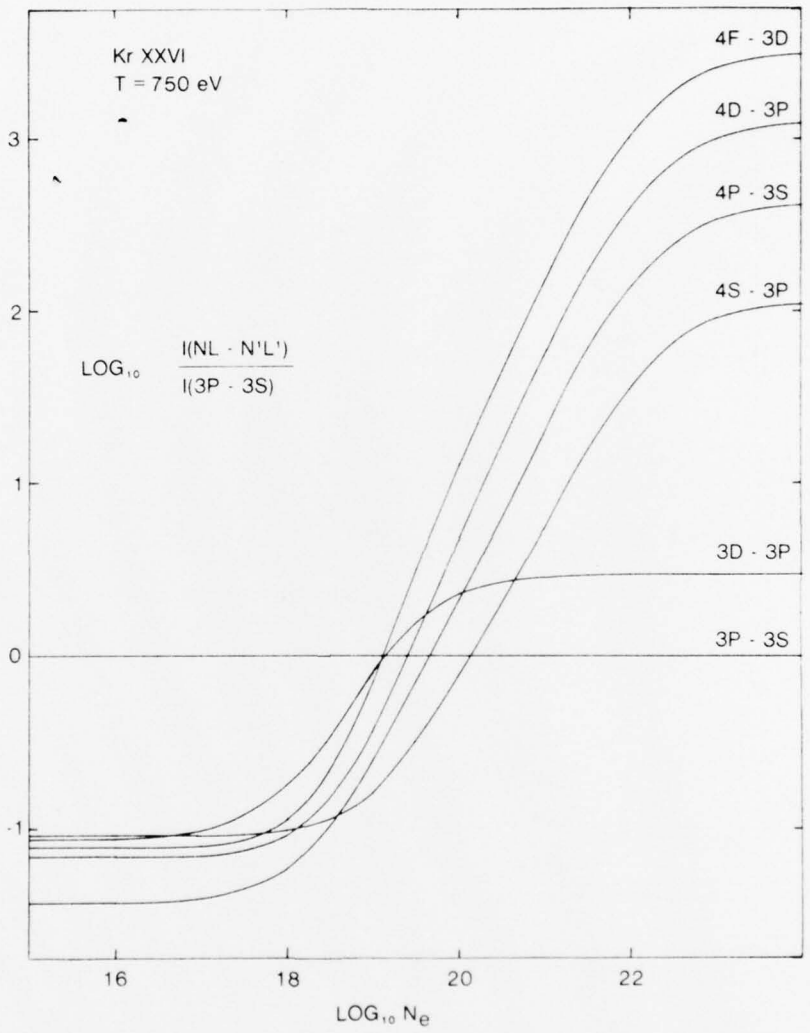
Kr XXVI
T = 750 eV
4F - 3D
4D - 3P
4P - 3S
4S - 3P
3D - 3P
3P - 3S
LOG10 I(NL - N'L') / I(3P - 3S)
3
2
1
0
-1
16
18
20
22
LOG10 Ne

Figure 4

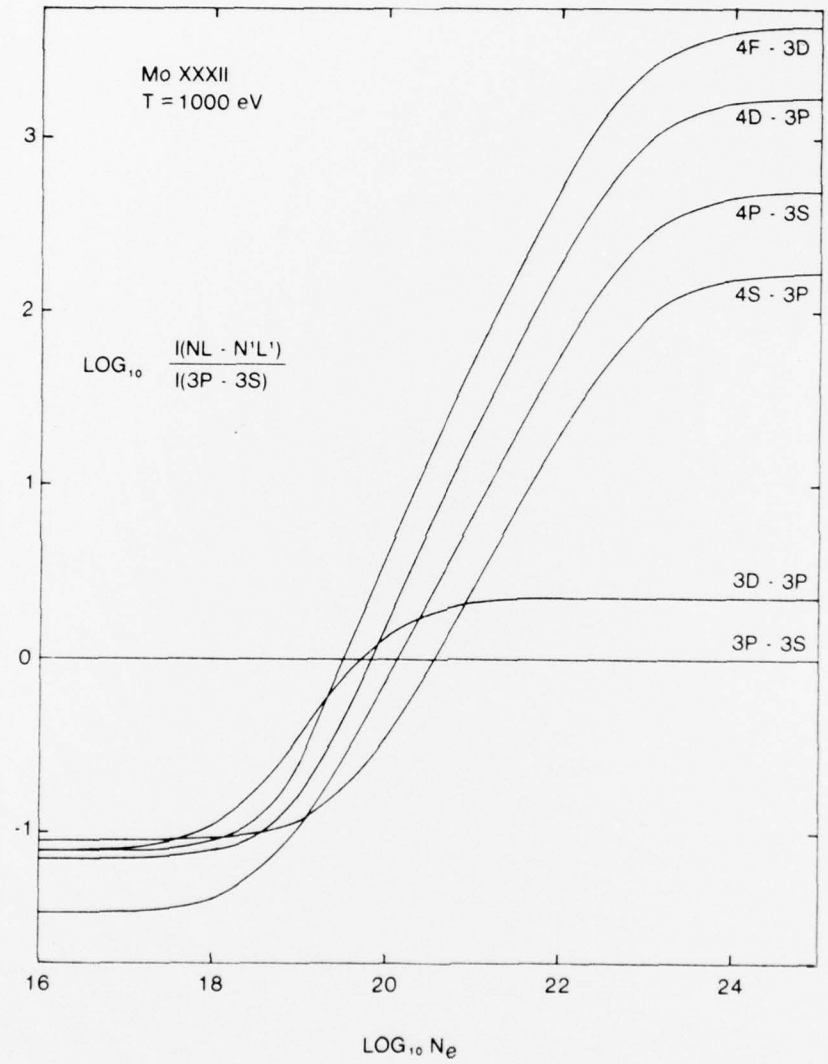
Mo XXXII
T = 1000 eV
4F - 3D
4D - 3P
4P - 3S
4S - 3P
3D - 3P
3P - 3S
LOG10 I(NL - N'L') / I(3P - 3S)
3
2
1
0
-1
16
18
20
22
24
LOG10 Ne

Figure 5